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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,041	01/15/2002	Charles W. Anderson	1327-DARPA	8722

7590 06/20/2003

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EXAMINER

LEYBOURNE, JAMES J

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Applicati n No.		Applicant(s)	
	10/031,041		ANDERSON ET AL.	
	Examiner		Art Unit	
	James J. Leybourne		2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7-14, 16, 18, 21 and 23 is/are rejected.
- 7) ☒ Claim(s) 1, 3-6, 14, 15, 17-20, 22 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                 | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)        | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1, 14, 17 and 18 are objected to because of the following informalities:

In claim 1, line 6 "scalable" should be "sealable".

In claim 14, line 2 "scalable" should be "sealable".

In claim 17, line 3 "scal" should be "seal".

In claim 18, line 3 "scalable" should be "sealable".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 7, 14, 16, 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wechsung (USPN 4296322) in view of Fisher (USPN 4819477).

Art Unit: 2881

Regarding claims 1, 7, 14, 16, 18 and 21, Wechsung teaches using a transporting belt **15** (analogous to a tape) to transport deposited samples into a sealable opening (locks **19**) of the extraction portion of a TOF Mass Spectrometer. In one embodiment (FIG. 1) the apparatus comprises a housing **1**, whose opening **2** is sealed in a vacuum-tight manner by covering flange **3**. The covering flange **3** is likewise provided with an opening **4**, which is sealed in a vacuum-tight manner by a covering glass **5** using o-rings. Electrode **9** defines an end of the extraction region.

Regarding claims 1 and 2, Wechsung does not teach an aerosol interface or a control unit that processes the MS signals.

Fisher teaches the detection of trace substances in air has many applications (abstract) and discloses a method and apparatus with an aerosol interface for trace sample collection comprising (column 1, lines 47-60):

(a) inlet means for receiving inlet air

(b) first and second collectors

(c) means for directing at least a portion of said inlet air through the collectors

(d) analyzer means,

It would be obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Wechsung to incorporate an aerosol interface, as taught by Fisher in order to have a portable apparatus for analyzing trace substances in the atmosphere with a mass spectrometer.

4. Claims 8-11 are rejected under 35 U.S.C. as being unpatentable over Wechsung as applied to claim 1 and in further view of Ishiguro (USPN 4757396). For greatest efficiency in a mass spectrometer that uses a tape transport it is desirable that the data collection time is independent of the data-analysis time. To achieve this, the movement of the tape at the sample collection station should be independent of the tape movement at the data analysis station. It is well known that using two motors that are asynchronously driven can provide independent movement of a tape.

Ishiguro teaches use of a tension member in a tape drive system to take up slack in the tape. In FIG. 5, magnetic tape **16**, wound between a take-up reel (machine reel) **11** and feed reel (file reel) **12**, travels over a roller **15a** of a tension arm **15**. The take-up reel **11** and feed reel **12** are driven by the drive motors **10a** and **10b**. It would be obvious to one of ordinary skill in the art at the time of the invention to provide independent motion of the tape transport to maximize the efficiency of the mass spectrometer and to provide a tensioning member as taught by Ishiguro to take up slack in the tape.

5. Claims 12, 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wechsung as applied to claim 1 in view of Standing (USPN 5376788). Standing teaches that, most frequently, ions are analyzed in linear time-of-flight (TOF) mass spectrometers, that is, the ions, once formed, are accelerated by an electric field and then allowed to travel in straight lines until they are detected. He further teaches use of a Reflectron TOF mass spectrometer to compensate for aberrations resulting from the initial velocity

distribution in TOF mass spectrometers (column 1, lines 50-54). It would have been obvious to one of ordinary skill in the art that, in a field portable mass spectrometer, either a linear TOF mass spectrometer or a Reflectron could be used. The selection would depend on whether it would be necessary to correct aberrations as taught by Standing.

Regarding claim 23, it is inherent that, if there is a vacuum valve between the extraction region and the main chamber of a mass spectrometer, the ions must pass through the valve and it must be part of the flight path.

***Allowable Subject Matter***

6. Claims 3-6, 15, 17, 19, 20 and 22 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is an examiner's statement of reasons for allowance:

Regarding claim 3-5, the prior art fails to disclose or reasonably suggest using a nebulizer to inject MALDI matrix particles into an environmental specimen prior to collecting the specimen in an aerosol interface.

Regarding claim 6, the prior art fails to disclose or reasonably suggest using particle collector/impactor stations to deposit aerosol samples onto a tape.

Regarding claim 15, it is well known in large scale vacuum systems, such as wafer handling systems, to use a vacuum isolation chamber that is sealed off

from the main chamber, for loading and unloading samples (see, for example, USPN 39225465 to Livesay). However, the prior art does not teach or reasonably suggest using a vacuum isolation chamber for miniaturized field portable vacuum systems. The primary feature that distinguishes the mass spectrometer of claim 15 from the prior art is the use of a sealable opening (sample inlet) and a vacuum valve (to isolate the loading chamber from the main vacuum chamber).

Claim 17 defines using separate vacuum pumps for the roughing chamber (vacuum lock) and the main chamber and claims 22 and 24 define using a single pump for both chambers. While these approaches have analogs in large vacuum systems, as discussed under claim 15, there is no teaching in the prior art for their use in portable vacuum systems.

Regarding claims 19 and 20, use of a the cover of a vacuum system as a platen to form a pressure seal in a vacuum chamber and using the cover to form one electrode of the extraction field of a TOF mass spectrometer is not disclosed or reasonably suggested in the prior art.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James J. Leybourne whose telephone number is (703) 305-7067. The examiner can normally be reached on M-F 9:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on (703) 308-4116. The fax phone numbers for the organization where this application or proceeding is

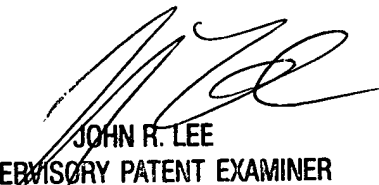


assigned are (703) 872-9319 for regular communications and (703) 872-9317 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-7060.

JJL

June 10, 2003



JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800